Name: _____
Score: _____ / _____

Quiz 2 on Lectures 3 &4

Part 1

Sugars, such as glucose or fructose are the basic building blocks of more complex carbohydrates. Which of the following foods is not a significant source of complex carbohydrates?

- A. oatmeal
- B. all of the answers are significant sources of complex carbohydrates.
- C. fresh fruit
- D. rice
- E. pasta

After the origin of relatively simple cells, more complex cells must have developed from these precursors. Eukaryotic cells:

- A. are the most primitive type of cell originating 3.2 billion years ago
- B. include the bacteria and viruses and are not considered as life forms
- C. only live in extreme environments without oxygen
- D. contain various membrane bound compartments, such as chloroplasts, mitochondria and nuclei
- E. are just a theory to explain complexity in nature and is baseless

The fact that the base pairs in DNA are complementary suggests for a replicating mechanism where information can be copied during cell division and transferred through generations. Which of the following nucleotide bases are present in equal amounts in DNA?

- A. adenine and guanine
- B. adenine and thymine
- C. thymine and guanine
- D. adenine and cytosine
- E. thymine and cytosine

The information in DNA is transferred to an intermediated, RNA. All of the following are features of RNA except:

- A. a different type of sugar than is found in DNA.
- B. a sugar-phosphate-sugar-phosphate backbone.
- C. a different type of base than is found in DNA.
- D. a coiled double-stranded always helical structure.
- E. an ability to direct protein production.

The double helix structure of DNA that is created by a sequence of bases was a clue to how one molecule of DNA could be replicated into two exact copies. DNA replication results in the same copy of DNA in each cell and

- A. occurs only during embryogenesis
- B. occurs only in prokaryotes and is the basis of bacterial growth
- C. never occurs after a cell has divided
- D. occurs before every cell divides
- E. occurs spontaneously if left on the lab bench

Diversity is a hallmark of life on earth. When individual cells divide they first make a copy of all the information they carry in their DNA. Every cell in an organism usually contains a nearly exact copy of all of the DNA that codes for that organism. However, ‘life’ creates with mistakes. Every so often cellular mechanisms make errors during the replication process. A mutation

- A. none of these answers are correct
- B. is never random
- C. is always a negative change for the organism
- D. occurs only in bacterial DNA
- E. occurs as a random change in DNA sequence of individual basepairs

The Flow of Information of life on earth usually occurs from

- A. DNA to RNA to Protein
- B. amino acids to complex carbohydrates
- C. the gravity
- D. gas to liquid to solid
- E. primarily viruses

Chained molecules like proteins or nucleic acids consist of smaller units. Which in the following list includes all others in the list?

- A. carbohydrate
- B. polysaccharide
- C. carbon
- D. monosaccharide
- E. disaccharide

Mutations in DNA can result in a change in the amino acid sequence which makes up a protein. Changing one amino acid within a protein could change what about that protein?

- A. the overall shape of the protein
- B. the function of the protein itself
- C. the primary structure of the protein
- D. all of these answers are correct
- E. the sequence of amino acids specified in the DNA sequence called a gene

The human genome is all of our DNA including our genes. What percentage of the human genome consists on genes?

- A. less than 10%
- B. None, our genes are not a part of our genome
- C. 50% from our mother and 50% from our father
- D. 100%, only genes are part of the genome
- E. 50%, genes and other DNA are equally proportionate in the genome

The structure of DNA as a double helix with complimentary strands was a major breakthrough in our understanding of biology. The major contributions to the discovery of the DNA double helix structure, (although not all were recognized by the Nobel prize Committee) were made by:

- A. Wilkins, Watson, Crick, and Franklin
- B. Darwin and Mendel
- C. Watson and Crick
- D. Watson and Hoagland
- E. Miller and Lamarck

The component which make up living cells include atoms, small molecules, complex organelles, and cell comprise tissues and tissues comprise organs and so on. The order that best represents size from the smallest to the largest biological entities is:

- A. Ribosomes-Mitochondria-Nuclei-Cells-Tissues
- B. Atoms-Molecules-Chain Molecules-Molecular Structures-Organelles-Cells
- C. all answers are correct
- D. Organelles-Tissues-Organs-Organism--Species
- E. Cells-Tissues-Organs-Individual

Because it is so commonplace many of us take water for granted. But it is in fact an unusual molecule in many ways. Most biologists consider that water is a prerequisite for life. Water can absorb and store a large amount of heat while increasing only a few degrees in temperature. Why?

- A. An increase in temperature causes an increase in cohesion of the water.
- B. The heat must first be used to break the ionic bonds rather than raise the temperature.
- C. Rather than raise the temperature of the water, the heat must first be used to break the hydrogen bonds
- D. An increase in temperature causes an increase in adhesion of the water and causes water to increase in density and then sink.
- E. Breaking of the covalent bonds using heat must first be done rather than raising the temperature.

At its most basic level all of life exists and is based on chemistry. Which of the following is not a chemical reaction?

- A. none of these answers are correct
- B. Ice melts to form liquid water
- C. Sodium metal and chlorine gas unite to form sodium chloride
- D. Sugar and oxygen combine to form carbon dioxide and water
- E. hydrogen gas combines with oxygen to form water

Living organisms have various characteristics in common. Which of the following is not a characteristic of all living organisms?

- A. they are complex yet organized
- B. they all rely only explicitly on non-organic material for replication
- C. they utilize chemical energy storage and utilization
- D. they all possess either DNA or RNA as an information basis
- E. they all contain of genetic information (RNA and/or DNA) capable of replication

The most simple and primitive cells on earth are the microbes, known as prokaryotic cells. Prokaryotic cells:

- A. are animal type cells with diverse biochemical compartments
- B. only live in extreme environment without oxygen
- C. are complex creature and usually do not live in diverse and extreme environments
- D. have membrane bound organelles that originated from bacteria
- E. lack internal organelles, such as mitochondria, chloroplasts or a membrane bound nucleus

In DNA replication an (A) adenine always pairs with

- A. tyrosine
- B. monosodium glutamate
- C. cytosine (C)
- D. thymidine (T)
- E. guanine (G)

The separation of molecules or cellular components can be achieved by using the fact that they have different size and density. An ultracentrifuge consists of a rotor that spins tubes containing materials and is:

- A. a tool used by cell and molecular biologists for separating and comparing cell components based on size and density
- B. the laboratory tool developed by Robert Hooke in the 1660s that he used to discover cells which was later modified to differentiate cell components based on their size and density
- C. was modified and then used to enrich uranium for nuclear warheads
- D. a component on a new type of microscope to allow cell components to be easily visualized based on their size and density
- E. a component on the recent Rover Mars mission used to look for life on other planets used to isolate components

Simple molecules like sugars, nucleotides and amino acids comprise larger chain molecules made up from these simple molecules. An example of chain molecules would be?

- A. oxygen molecules
- B. aspirin
- C. mitochondria
- D. cells
- E. proteins

One question regarding the evolution of eukaryotic cells was the origin of organelles. The endosymbiont hypothesis:

- A. has been banned from being taught in the public schools of Kansas, Texas and Florida
- B. was a false hypothesis and has been shown to be false by modern molecular and cell biology
- C. is key evidence in favor of Intelligent Design
- D. has accrued sufficient evidence to explain the origins of chloroplasts and mitochondria
- E. was first described by James Watson and Francis Crick as the origin of DNA